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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,586	10/24/2003	Yorimichi Dairoku	45934	6944

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EXAMINER	
BERNSHTEYN, MICHAEL	

ART UNIT	PAPER NUMBER
1713	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/691,586	DAIROKU ET AL.	
	Examiner	Art Unit	
	Michael Bernshteyn	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-5 is/are pending in the application.

4a) Of the above claim(s) 5 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-4 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-5 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 24 November 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. This Office Action follows a response filed on November 7, 2005. No new claims were added or amended. Claims 1-4 are pending.

Claim Rejections - 35 USC § 103

2. The test of this section of Title 35, U.S.C. not included in this action can be found in a prior Office Action.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Ballard et al. (U.S. Patent 3,988,509) in view of Wu et al. (U.S. Patent 6,252,016).

With regard to the limitation of instant claims 1 and 3, Ballard discloses continuous process for the production of reduced melt index, low gel content ethylene copolymers comprising the in-line addition of a solution of a free radical initiator into the polymer stream under turbulent conditions (abstract). A typical high-pressure, stirred reactor, free radical-initiated, continuous polymerization process in which the benefits of the invention can be realized as illustrated in the Figure. (col. 3, lines 46-68 and col. 4 lines 1-2). Feed stream 1 consists essentially of about 5-20 weight percent (preferably about 10-15 weight percent) of fresh monomer makeup stream2, about 80-95 weight percent of recycled unreacted monomer streams 3 and 12 and initiator stream 4. **Monomer makeup stream 2 is a mixture of ethylene with one or more**

copolymerizable monomers (such as vinyl acetate) and accordingly, unreacted monomer stream 3 will contain ethylene and unreacted comonomer. Initiator stream 4, comprising a solution of a conventional reaction initiator...suitable for the temperature at which the polymerization is being run, is injected into **the feed stream at the entrance to reactor 5**. Feed stream 1 enters reactor 5 at a temperature **substantially lower** (usually 100 C, or more below reaction temperature) than that at which **the polymerization is run**. Usual feed temperatures are in the range of about O°C-60°C. The feed stream is introduced into the reactor at about 1000-2500 atmospheres, preferably about 1300-2000 atmospheres, pressure (col. 3, lines 46-68 and col. 4 lines 1-2).

Ballard discloses that the free radical initiator, or if preferred for safety or convenience reasons, a solution thereof in, e.g., mineral spirits or in one of the other suitable solvents discussed below, is injected at a controlled but variable rate into the solvent stream in line 10. Flow conditions are such that **excellent mixing of the free radical initiator and solvent streams occurs before the resulting solution contacts the polymer flowing from the first to the second separator** (col. 4, lines 33-42).

Ballard does not disclose to use premixing in a supply pipe line to which the monomer liquid is continuously supplied to continuously stir the monomer liquid in the supply pipe.

Wu discloses a continuous process for preparing polymers which includes the steps of continuously feeding a reaction mixture containing a monomer into a channel, continuously controlling the temperature of the channel, polymerizing the monomer in

the channel and continuously removing the polymer the polymer from the channel. Wu discloses that in cases where the monomer emulsion has the tendency to become unstable **before polymerization,** it can be pre-mixed and thus stabilized before being fed to the non-cylindrical channel. A mixer such as a static mixer or pre-mixer can be used in the process for this purpose (col. 6, lines 49-54). For all Examples, monomer emulsions were prepared by **admixing** butyl acrylate, metyl methacrylate, methacrylic acid, an anionic surfactant, an electrolyte, a chelating agent, and water **in a vessel. The admixture was stirred** until an emulsion was formed (col. 7, lines 11-15). In the example #1 a monomer emulsion was fed from monomer tank. **The feed tank** was equipped with a funnel, a **dip pipe, an agitator,** cooling capability, and a weigh scale. The monomer emulsion in the feed tank was constantly agitated in order **to insure homogeneity** (col.7, lines 18-23).

Furthermore, according to Cambridge Dictionaries online (www.onelook.com), vessel (tank) is a tube that carries liquids, and pipe is also a tube inside which liquid or gas flows from one place to another. Therefore, in a broad sense, there is no significant difference between vessel and pipe in the absence of pipe size defined in the claims.

Therefore, it would have been obvious to one having ordinary skilled in the art at the time the invention was made to incorporate the teaching of stirring liquid monomer of Wu into Ballard 's monomer feeding line in order to achieve good homogeneity of the liquid monomers in the supply pipe line (or tank, or vessel) for premixing of monomers before blending with the initiator.

With regard to the limitation of instant claim 2, Ballard discloses that about **0.25 to 20% of solvent**, based upon the weight of the copolymer**, is introduced into the reaction mixture** (claims 11-13, col. 10, lines 47-55). Thus, it is easy to calculate that a monomer liquid having a concentration 80-99.75% is used as the monomer liquid, which is completely with the claimed range (not less than 40%).

With regard to the limitation of instant claim 4, it is obvious that reaching Reynold's number is reasonably presumed to be met since the constant agitation is taught in the reference by Wu (col. 7, line 26) and because the feed rate of the monomer was adjusted to 200 ml/min (col. 7, line 51 and col. 8, line 51). It is worth to mention that claimed critical Reynold's number (not smaller than 50) does not show the turbulent condition. It is well known fact that Reynold's number much below 2100 (for example, Re=51) correspond to **streamline flow**, while values above 3000 correspond to **turbulent flow** (see Richard J. Lewis Sr. "Hawley's Condensed Chemical Dictionary", 14th Edition, John Wiley & Sons, Inc. page 963).

Thus, the combination of Ballard and Wu renders claims 1-4 *prima facie* obvious in view of absent of unexpected results commensurate in scope of claims.

Response to Arguments

3. Applicants traverse the rejection of claims under 35 U.S.C. 103 (a) as being unpatentable as obvious over Ballard et al. (U.S. Patent 3,988,509) in view of Wu et al. (U.S. Patent 6,252,016). Applicant's arguments have been fully considered but they are not persuasive.

Applicants contend that Wu et al. does not disclose mixing the initiator with the emulsion prior to feeding to the reactor or feeding the initiator to the mixing apparatus for forming the stable emulsion. Therefore, it would not have been obvious to modify the process of Ballard et al. as suggested in the Action (page 4).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ballard discloses that initiator stream 4, comprising a solution of a conventional reaction initiator (such as dialkyl peroxypivalate) suitable for the temperature at which the polymerization is being run, is injected into **the feed stream at the entrance to reactor 5** (col. 3, lines 58-63).

Applicants contend that the present invention is directed to a process of continuously supplying a monomer liquid to a supply pipe and continuously stirring the monomer liquid to form a **turbulent flow** of the monomer liquid. The initiator is then

added to the **turbulent flow** of the monomer liquid to obtain a mixture of the monomer and initiator. Applicants pointed out that an important feature of the invention is producing the **turbulent flow** of the monomer liquid in the flow pipe and thereafter introducing the initiator into the turbulent flow (page 5). Applicants contend that the polymerization initiator is introduced into the **turbulent flow** of the monomer liquid and polymerization initiator, and as noted above, Ballard et al. and Wu et al. do not disclose or suggest this feature (page 5).

It is worth to mention that instant claim 1 and all dependable claims 2-4 do not have any suggestion about the **turbulent flow of the monomer liquid**. The critical Reynolds number (not smaller than 50) does not show the turbulent condition (see § 2 above), for example, Re=51 is not the turbulent flow.

Applicants contend that even if one were to combine the teaching of Wu et al. with Ballard et al., the resulting combination would not be the claimed invention. The resulting process would still not stir the monomer liquid and thereafter introduce the initiator to mix the initiator with the monomer liquid being in stirred form state, which is then fed to the reactor (page 6).

However, Wu discloses that in examples, monomer emulsions were prepared by **admixing** butyl acrylate, metyl methacrylate, methacrylic acid, an anionic surfactant, an electrolyte, a chelating agent, and water **in a vessel. The admixture was stirred** (col. 7, lines 11-15). Therefore, it would have been obvious to one having ordinary skilled in the art at the time the invention was made to incorporate the teaching of stirring liquid monomer of Wu into Ballard 's monomer feeding line in order to achieve

good homogeneity of the liquid monomers in the supply pipe line (or tank, or vessel) for premixing of monomers before blending with the initiator.

Applicants contend that claim 2 recites that the monomer liquid has a concentration of not less than 40 weight % and demand the clarification of the examiner citation because the Action refers to absent column (page 6). The examiner accepts this mistake and tries to clarify the rejection.

Ballard discloses that about **5 to 20% (even 0.25%) of solvent**, based upon the weight of the copolymer**, is introduced into the reaction mixture** (claims 11-13, col. 10, lines 47-55). Thus, it is easy to calculate that a monomer liquid having a concentration 80-95% (even 99.75%) is used as the monomer liquid, which is completely within the claimed range (not less than 40%).

Applicants contend that claim 3 recites that the monomer liquid has a temperature of not lower than 50^0C in the supply pipe, Thus, claim 3 recites the monomer liquid being at a temperature of not lower than 50^0C when being continuously stirred and when the polymerization initiator is introduced to the monomer liquid being in the stirred state. Ballard and Wu do not disclose or suggest the claimed temperature under these conditions (page 7).

Ballard clearly discloses that feed stream 1 **enters reactor 5** at a temperature **substantially lower** (usually 100 C, or more below reaction temperature) than that at which the **polymerization is run**. Usual feed temperatures are in the range of about O°C-60°C (col. 3, lines 63-67). So, the claimed range of temperature **before the polymerization process** is obvious in view of Ballard et al.

Applicants contend that claim 4 recites that the monomer liquid is stirred to produce a Reynolds number not smaller than 50 and the passages from Action do not suggest the claimed Reynolds number of a monomer liquid as in the present invention (page 10).

Wu discloses that reaching Reynold's number is reasonably presumed to be met since the constant agitation is taught (col. 7, line 26) and because the feed rate of the monomer was adjusted to 200 ml/min (col. 7, line 51 and col. 8, line 51).

In response to applicant's argument that Ballard and Wu references is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Ballard's reference discloses continuous process for the production of reduced melt index, low gel content ethylene copolymers comprising the in-line addition of a solution of a free radical initiator into the polymer stream under turbulent conditions (abstract). Wu et al discloses a continuous process for preparing polymers. The continuous process includes the steps of continuously feeding a reaction mixture containing a monomer into a non-cylindrical channel, continuously controlling the temperature of the non-cylindrical channel by exposing the surface of the non-cylindrical channel not exposed to the monomer to a temperature control medium, polymerizing the monomer in the non-cylindrical channel, and continuously removing the polymer from the non-cylindrical channel. The continuous process is suitable for the

preparation of polymers containing ethylenically unsaturated monomers as polymerized units by emulsion polymerization, solution polymerization, and suspension polymerization (abstract). Certainly, both references belong to the same field of endeavor concerning the continuous process for preparing polymers containing ethylenically unsaturated monomers and reasonably pertinent to the particular problem with which the applicant was concerned.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

4. In the light of the discussion above, the rejection of record has not been withdrawn. The rejection remains in force.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Bernshteyn
Examiner
Art Unit 1713

MB
01/19/2006

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